AMENDMENTS TO THE CLAIMS

Claim 1 (Currently Amended) A software-defined radio system comprising:

a plurality of digital frequency mixers for, upon receiving a digitalized intermediate frequency signal, converting the received intermediate frequency signal to a baseband signal;

a receiver filter for removing a high-band signal from the converted baseband signal, each digital frequency mixer is associated with different radio frequencies (RF) for multiple communication standards associated with different RF and different bandwidths;

a receiver filter building block for controlling implementation of the receiver filter to support the multiple communication standards, the receiver filter building block including a first multiplexer for supporting filter coefficients for the multiple communication standards simultaneously, and a second multiplexer only used for inconsecutive long filter coefficients;

an implementation controller for controlling implementation of the receiver filter building block; and

a filter coefficient calculator for receiving information about a specification of the receiver filter from the implementation controller, calculating a coefficient of the receiver filter using the received information, and providing the calculated coefficient of the receiver filter to the implementation controller,

wherein a digital intermediate frequency signal is processed in the software-defined radio system, which is driven by software, the receiver filter building block controls the implementation of the receiver filter to make the receiver filter share common resources for the multiple communication standards, and select additionally required resources for each communication standard other than the shared resources by a switching operation, the additionally required resources including an additional filter coefficient multiplier and an additional register corresponding to an order of an additional filter function.

Claim 2 (Original) The apparatus as claimed in claim 1, further comprising:

a radio frequency (RF) signal processor for converting an externally received signal to an analog intermediate frequency signal; and

an analog-to-digital converter for converting the analog intermediate frequency signal to a digital intermediate frequency signal, and sending the converted digital intermediate frequency signal to the digital frequency mixer.

Claims 3-4 (Canceled)

Claim 5 (Previously Presented) The apparatus as claimed in claim 1, wherein the receiver filter building block designs the receiver filter as a finite impulse response filter having a discrete coefficient so as to make the receiver filter reconfigurable.

Claim 6 (Original) The apparatus as claimed in claim 5, wherein the receiver filter building block makes the coefficients of the receiver filter comprised of summations or differences of power-of-2 terms, shares shift and summation resources of a common coefficient, and implements all coefficients, apart from the communication standard caused by an addition of a shift or a summation.

Claim 7 (Currently Amended) The apparatus as claimed in claim 6, wherein the receiver filter comprises:

a filter coefficient multiplier for multiplying the coefficients of the receiver filter; a register corresponding to an order of the receiver filter;

a summator for performing an operation of the receiver filter~~; and~~

~~a multiplexer for supporting filter coefficients for the multiple communication standards simultaneously~~.

Claim 8 (Currently Amended) The apparatus as claimed in claim 7, wherein the first multiplexer selects implementation of the receiver filter for one of the multiple communication standards according to an instruction of the implementation controller.

Claim 9 (Currently Amended) The apparatus as claimed in claim 8, wherein the receiver filter uses the first multiplexer to reduce hardware, when the short receiver filter does not need to use the register.

Claim 10 (Original) The apparatus as claimed in claim 2, wherein the implementation controller constructs a trellis defining, as a cost, a saved quantity of hardware caused by shared resources after matching the short filter to the long filter, the trellis defining each status as a coefficient of the long filter having the short filter allocatable thereto.

Claim 11 (Original) The apparatus as claimed in claim 10, wherein the implementation controller eliminates an allocation method not maximizing a resource sharing, when resource allocation searching is performed for the constructed trellis.

Claim 12 (Original) The apparatus as claimed in claim 11, wherein the implementation controller distributes the resources of the coefficient of the receiver filter by dynamic programming based on the constructed trellis.

Claim 13 (Original) The apparatus as claimed in claim 12, wherein when the receiver filter is a linear phase finite impulse response filter, the implementation controller performs trellis searching for half the coefficients of the linear phase finite impulse response filter, and allocates the rest of the coefficients in a mirror image of the searching result.

Claim 14 (Original) The apparatus as claimed in claim 2, wherein the filter coefficient calculator externally receives information about the specification of the receiver filter, or calculates the coefficient of the filter adequate to a corresponding standard.

Claim 15 (Original) The apparatus as claimed in claim 14, wherein the filter coefficient calculator represents values allowed for each coefficient of the receiver filter as a linear combination, and calculates the coefficient of the receiver filter by linear programming for the linear combination.

Claim 16 (Original) The apparatus as claimed in claim 1, wherein the intermediate frequency is four times as high as the baseband frequency.

Claim 17 (Currently Amended) A digital filter comprising:

a first multiplexer for supporting filter coefficients for multiple communication standards having different radio frequencies and different bandwidths simultaneously;

a second multiplexer only used for inconsecutive long filter coefficients;

a filter coefficient multiplier for multiplying the coefficients; a register corresponding to an order; and

a summator for performing an operation, the digital filter being constructed to share common resources according to the multiple communication standards, and select additionally required resources other than the shared resources by a switching operation,
wherein the additionally required resources including an additional filter coefficient multiplier and an additional register corresponding to an order of an additional filter function, the digital filter shares the common resources by including a resource for setting a filter having a relatively small length in a resource for setting a filter having a largest length, and the digital filter operates in a digital intermediate frequency signal processing device in a software-defined radio.

Claim 18 (Original) The digital filter as claimed in claim 17, wherein the digital filter implements a corresponding coefficient with an external input or an internal filter coefficient calculator.

Claim 19 (Currently Amended) A method for processing a digital intermediate frequency signal comprising:

(a) converting a digitalized intermediate frequency signal to a baseband signal, upon receiving the intermediate frequency signal;

(b) removing a high-band signal from the converted baseband signal;

(c) controlling implementation of a receiver filter performing (b) to support multiple communication standards having different radio frequencies and different bandwidths;

(d) calculating a coefficient of the receiver filter using information about a specification of the receiver filter, upon receiving the information from an implementation controller for controlling implementation of a receiver filter building block performing (c); and

(e) providing the calculated coefficient of the receiver filter to the implementation controller,

wherein the digital intermediated frequency signal is processed in a software-defined radio system, which is driven by software, and (c) comprises:

sharing common resources according to the multiple communication standards by including a resource for setting a receiver filter having a relatively small length in a resource for setting a receiver filter having a relatively small length in a resource for setting a receiver filter having a longest length; ~~and~~

selecting additionally required resources for each communication standard by a switching operation, the additionally required resources including an additional filter coefficient multiplier and an additional register corresponding to an order of an additional filter function, and

combining inconsecutive coefficients of the receiver filter having the longest length to which coefficients for two consecutive orders of the receiver filter having a relatively small length are allocated.

Claims 20-21 (Canceled)

Claim 22 (Previously Presented) The method as claimed in claim 19, wherein (d) comprises:

defining, as a cost, a saved quantity of hardware caused by the shared resources when matching the short receiver filter to the long receiver filter; and

constructing a trellis defining each status as a coefficient of the long receiver filter having the short receiver filter allocatable thereto.

Claim 23 (Original) The method as claimed in claim 22, wherein (d) comprises:

distributing the resources of the coefficients of the receiver filter by dynamic programming based on the trellis.

Claim 24 (Original) The method as claimed in claim 23, wherein (d) comprises: externally receiving information about a specification of the receiver filter; and calculating the coefficient of the receiver filter based on the input information.

Claim 25 (Canceled)